numbers 11, 12, and 13 are extensively discussed in the specification in connection with Figure 10, but they are not shown in Figure 10." The Examiner required that the numbers be included. The Examiner further added that ". . . reference numbers 1 and 3 are shown in Figure 10 but not described in the specification."

The Examiner further objected to Figure 11 stating that "Undefined reference number 1 is also shown in Figure 11."

The Examiner further objected to Figures 10 and 11 as failing to comply with 37 CFR 1.84(p)(4) because reference character "5" has been used to designate both lines of flux in Figure 10, and survey tools in Figure 11 and because reference character "4" has been used to designate both a magnet in Figure 10, and an adapter sub in Figure 11.

In all cases the Examiner required a proposed drawing correction or corrected drawings in reply to the Office action to avoid abandonment of the application and stated that his objections to the drawings would not be held in abeyance.

Specification

The Examiner objected to the disclosure because of inconsistent terminology. The Examiner gave an example stating that, "throughout the specification the Applicant refers to cams, sleeves, eccentric sleeves, non-concentric sleeves, concentric sleeves, sleeves with an offset, sleeves without an offset, housings, eccentric housings, etc." The Examiner was unclear as to which of those terms were synonyms and to which of those terms designated a unique structure. The Examiner required that Applicant thoroughly edit the specification and ensure that the terminology is clearly and precisely defined and consistent.

The Examiner kindly listed a series of specific objections center on the Brief Description of the Drawings Section of the application at bar. Specifically stating that the description indicates that in Figure 2, the weighted side 20 of the device 10 is on the left, however, the weighted side is on the right side of the drawing. The Examiner noted that Figure 4A is not included in the Brief Description of the Drawings section. Further the Examiner noted that the device in Figure 5A is described as making a right turn, but the device is apparently making a left turn; whereas, the device in Figure 5B is described making a left turn, but the device is apparently

making a right turn.

The Examiner continued by stating that Figure 9 seems to be described as a cross section of Figure 8 taken at A-A and that this is an incorrect description. The Examiner found that contrary to the description in the Brief Depiction of the Drawings, the reference numbers in Figure 11 do not specifically identify an MWD tool, and it was unclear from the specification that the disclosed embodiment can be "used for left/right borehole correction only," as stated in the Figure 11 description.

Finally the Examiner found a missing drawing, namely Figure 8A and an extra drawing, namely Figure 12C stating that, ". . . on page 23 line 11, Applicant refers to Figure 8A, however, there is no Figure 8A. Figure 12 C is not described or referenced in the Detailed Description of the Invention section."

Claim Objections

The Examiner objected to Claim 31 because the referred to the "heavy side" of the housing noting that, as described in claim 1, the term should be the "weighted side." The Examiner required appropriate correction.

Claim Rejections- 35 USC § 112

The Examiner quoted from the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The Examiner then rejected claim 51 under 35 U.S.C. 112, first paragraph because it contained subject matter which was not described in the specification in such a way as to enable one skilled in the art which it pertains, or with which it is most nearly connected to make and/or use the invention. In particular the Examiner noted that "claim 51 requires the track portion of the sleeve rotating mechanism to be located on the outside surface of the direction controller. The specification describes the direction controller as comprised of two eccentric sleeves 12, 13. Locating the track mechanism on the outside surface of the sleeve assembly 12, 13, would put the

track on the outside of the device 10, which is not shown in the drawings or described in the specification."

The Examiner then quoted from the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

The Examiner then rejected claims 2, 6, 21, 22,3 3, 35, 38 and 46 under 35 U.S.C. 112, second paragraph.

In particular the Examiner rejected Claims 2, and 6 as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regarded as the invention. The claim cited the limitation "said centerline is halfway along the length of the housing in the direction of rotation," but it was unclear as to which center line the claim refers. The Examiner noted that, Figures 1 and 3 showed an axial centerline, while Figure 4 depicted as many as 3 centerlines, and Figure 4A depicted 2 centerlines. The Examiner went on to say that from the description in the claim, it was unclear if the centerline bisected the component (the housing 13) laterally, or axially, that the description of the centerline as "in the direction of the rotation axis" was confusing and that there was a lack of antecedent basis in claim 6 for the limitation "the centerline."

The Examiner discussed claim 21 noting that the phrase "more preferably" rendered the claim indefinite because it was unclear whether the limitation(s) following the phrase are part of the claimed invention. Similarly in claim 22, the phrase "or the like" rendered the claim(s) indefinite because the claim(s) included elements not actually disclosed (those encompassed by "or the like"), thereby rendering the scope of the claim(s) unascertainable. See MPEP § 2173.05(d).

The Examiner stated that claims 33 and 35 recited the limitation "said radial position," and noted that there was insufficient antecedent basis for the limitation in the claims. In claim 35, the Examiner was unclear as to exactly which component the term "radial position" applied to.

The Examiner found that there was insufficient antecedent basis for limitation "said geological strata" in Claim 38.

Finally the Examiner rejected claim 46 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which

applicant regards as the invention. It was noted that claim 46 was dependent on claim 43 and that claim 43 described an apparatus comprising a drilling member controlled by a directional controller. However, claim 46 indicated that the drilling member comprises an apparatus according to claim 1 which already includes a directional controller.

Claim Rejections – 35 USC § 102

The Examiner quoted from the appropriate paragraph of 35 U.S.C. 102 that formed the basis for the rejections made in the Office action:

> A person shall be entitled to a patent unless –
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The Examiner then rejected claims 1-5,7-9, 18-20,22-35, and 47-53 under 35 U.S.C. 102(b) as being unpatentable over U.S. Patent 5,979,570 to McLoughlin. The Examiner then explained his objections as follows.

With respect to claims 1- 4, 7, 8, and 30, the Examiner stated that, McLoughlin disclosed an apparatus 10 for selectively controlling the direction of a well bore 2 comprising a mandrel 11 capable of passing well bore fluids, and rotatable about a rotation axis; a direction controller 10 comprising at least two parts 12, 13, configured to apply a force to said mandrel with a component perpendicular to said rotation axis; a housing 13 having an eccentric longitudinal bore forming a weighted side 20 and configured to freely rotate under gravity; and a driver 26, 27, for selectively varying the angle of force relative to the weighted side 20 of the housing 13 about said rotation axis, the driver 26, 27, being configured to move the two parts 12, 13, independently of one another. The Examiner added that the two parts 12, 13 were configured to apply a null force to said mandrel 11.

With respect to claims 5, and 9, the Examiner stated that, the disclosed sleeve 12 comprises a first part, which has an eccentric bore, and a second part that has an eccentric bore. The Examiner noted that the sleeve 12 was located at least partially within the eccentric bore of the housing 13.

With respect to claim 6, the Examiner stated that, the sleeve comprised a first part 12, which has an eccentric bore, and a second part 11, which has a concentric bore. The Examiner

noted that, "because of the undefined nature of the term "centerline" as used in this claim, the term is read very broadly . . ." (The Examiner referred to his earlier rejection of claim 6 under 35 USC § 112 (1st ¶).

With respect to claims 18-20, the Examiner stated that, the device includes two stabilizer shoes 21, located on the outside of the housing 13, and that the stabilizer shoes 21 are offset by a predetermined amount in relation to the weight of the housing 13.

With respect to claim 22, the Examiner stated that, the driver 26, 27, comprised a hydraulic or electric motor 26, as described in column 8, lines 50-60.

With respect to claims 23-29, and 31-33, the Examiner stated that, in column 10, lines 54 to 70, and column 11, lines 1-52, McLoughlin described a logic means and technique to signal the surface as to the position of the eccentric sleeve. The sensor signal is decoded at the surface and the logic means sends signals via mud pulses or electrical signals back down to a logic means associated with the direction controller 10, where the logic means decodes the signals and responds as appropriate. Specifically lines 48-52 indicate that the logic means may be an integral part of the direction controller 10, or may be located completely separate from the direction controller 10. Furthermore, an energy source or power pack for supplying the logic circuits can be located within the tool.

With respect to claims 34 and 35 column 11, the Examiner stated that, lines 32 to 45, described an apparatus 10 wherein a mandrel 11 is connected to a drill string 9 wherein drilling parameters include drill pipe 9 rotation and the logic means includes a means for detecting drill string 9 rotation and determining a time period between rotation and non-rotation wherein the time period determines when the angle of force should be changed with respect to the weighted side 20 of the housing 3.

With respect to claims 47-53, the Examiner stated that, Figure 8 discloses a drive wheel 26 and track 25, 27, said drive wheel engagable with said track 25, 27, such that movement of the drive wheel 26, causes movement of said track 25, 27, relative to said drive wheel 26. The drive wheel, when stationary, prevents movement between the track 25,27, and drive wheel 26, the drive wheel 26, and track 25,27, being located such that movement of the drive wheel 126, effects relative movement between the force and weighted side 20 of the housing 13. The track 25, 27, is

located on the inner surface of the housing 13, which is part of the directional controller 12, 13. The drive wheel 26, comprises a plurality of teeth, which interlock with the teeth on the track 25, 27. The direction of force is changed in response to the rotation of the drive wheel 26.

Claim Rejections – 35 USC § 103

The Examiner quoted from the appropriate paragraph of 35 U.S.C. 103(a) which formed the basis for all obviousness rejections made in the Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title. if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The Examiner then rejected claims 38-46 under 35 U.S.C. 103(a) as being unpatentable over McLoughlin in view of U.S. Patent 5,439,064 to Patton. The Examiner then explained his objections as follows stating that, McLoughlin disclosed the invention substantially as claimed, however, McLoughlin does not disclose a sensor coupled to the directional controller that senses geological data, and supplies the data to the directional controller. In Figure 4, and in column 7, lines 25-42, Patton discloses a compliant sub/directional controller 66 that provides mechanical control of direction of penetration. The directional controller 66 includes near bit sensors 86 that provide formation information including, among other things, gamma ray information. Down hole equipment also includes several other sensors including strain sensors 564a, 564b, and tension compression sensors, 562a, 562b, which sense formation information as encountered by the bit. Figure 17 shows, in part, how the sensed information is processed and compared to anticipated lithology characteristics to allow for essentially continual correction of the directional control apparatus. In column 24, lines 28-35, Patton describes this process as the "automatic adaptive directional control process." Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus disclosed in McLoughlin to include the geological sensor as disclosed by Patton. One would have been motivated to make the

modification because in column 26, lines 5-10, Patton teaches that the adaptive system provides a swift and accurate response to anisotropic drilling properties of a formation during drilling. More generally, column 5 lines 1-4 indicates that the system is capable of drilling a high quality bore hole accurately along a three dimensional well profile plan.

Allowable Subject Matter

The Examiner stated that claim 21 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action, and if it included all of the limitations of the base claim and any intervening claims.

Prior Art made of Record

The Examiner stated that prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art included U.S. Patent 4,697,650 to Fontenot, U.S. Patent 5,358,059 to Ho and U.S. Patent 3,626,482 to Quichaud.

Draftsperson's Review

Finally, there was the Draftsperson's Review was based on the informal revised drawings submitted with the original application. The Draftsperson essentially (and properly) rejected the drawings because of erasures/alterations, improper character of lines, and improper numbering and shading.

AMENDMENTS

General Remarks

It is difficult to clearly distinguish where corrections should be made in the specification because the specification was filed in PCT format without line numbering or, as required in US practice, without paragraph numbering. With this in mind, Applicants will identify modifications by page and line number and where necessary will supply substitute pages or sections. In regard